STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0128937
Owner:	Village of Saddlebrooke
Address:	15111 South U.S. Highway 65, Saddlebrooke, MO 65630
Continuing Authority:	Same as above.
Address:	Same as above.
Facility Name:	Saddlebrooke Wastewater Treatment Facility
Facility Address:	15111 South U.S. Highway 65, Saddlebrooke, MO 65630
Legal Description:	NE ¼, SE ¼, Sec. 36, T25N, R21W, Christian County
Receiving Stream:	Bull Creek* (P) *Stormwater runoff from no-discharge irrigation site flows to Bull Creek
First Classified Stream and ID:	Bull Creek (P) (02423)
USGS Basin & Sub-watershed No.:	(11010003-010006)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Outfall #001 – POTW - SIC #4952

No-discharge System

Individual anaerobic settling tanks / recirculating textile filter / flow measurement / wastewater irrigation / sludge disposal by contract hauler.

Design population equivalent is 670.
Design flow is 50,230 gallons per day.
Design sludge production is 4.7 dry tons/year.

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

March 22, 2005
Effective Date

Doyle Childers, Director, Department of Natural Resources
Executive Secretary, Clean Water Commission

March 21, 2010
Expiration Date

R. Bruce Martin, Director, Southwest Regional Office

FACILITY DESCRIPTION (continued)

Outfall #001 – Irrigation System Design

Receiving Stream Watershed: a gaining stream setting

Facility Type: No-discharge Primary Treatment, Storage, & Subsurface Irrigation System for year round flows.

Outfall #001 – Land Application System Design:

Irrigation volume per year:	18,334,000 gallons
Irrigation areas:	18.5 acres at design loading
Reserve irrigation areas:	18.5 acres at design loading
Application rates per acre:	0.1038 inches/day; 37.9 inches/year
Field slopes:	less than 6.0 percent
Equipment type:	Subsurface Irrigation
Vegetation:	Midland Bermuda Grass (warm season); Tall Fescue Grass (cool season)
Application rate is based on:	The estimated phosphorus uptake of the combined plots is estimated to be thirty (30) pounds of phosphorus per year, the application rate is based on the grasses removing 50% of the applied phosphorus as hay.

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
MONITORING WELLS (ALL)						
Up-Gradient Monitoring Wells						
Biochemical Oxygen Demand$_5$	mg/L	*		*	once/month	grab
Total Phosphorus as P	mg/L	*		*	once/month	grab
Total Kjeldahl Nitrogen as N	mg/L	*		*	once/month	grab
Nitrate plus Nitrite as N	mg/L	*		*	once/month	grab
Fecal Coliform	#/100mL	**		**	once/month	grab
Down-Gradient Monitoring Wells						
Biochemical Oxygen Demand$_5$	mg/L	*		*	once/month	grab
Total Phosphorus as P	mg/L	*		*	once/month	grab
Total Kjeldahl Nitrogen as N (TKN)	mg/L	*		*	once/month	grab
Nitrate plus Nitrite as N	mg/L	*		*	once/month	grab
Fecal Coliform	#/100mL	**		**	once/month	grab
Groundwater Compliance						
$\frac{\text{Down-gradient Monitoring well Average } BOD_5}{\text{Up-gradient Monitoring well Average } BOD_5} \times 100$	%			105	once/month	calculated
$\frac{\text{Down-gradient Monitoring well Average P}}{\text{Up-gradient Monitoring well Average P}} \times 100$	%			105	once/month	calculated
$\frac{\text{Down-gradient Monitoring well Average Total N}}{\text{Up-gradient Monitoring well Average Total N}} \times 100$	%			105	once/month	calculated

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE MAY 28, 2005. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Parts I, II & III STANDARD CONDITIONS DATED October 1, 1980 and August 15, 1994, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
IN-STREAM MONITORING POINTS						
Up-Stream Monitoring Point						
Biochemical Oxygen Demand$_5$	mg/L	*		*	once/month	grab
Total Phosphorus as P	mg/L	*		*	once/month	grab
Total Kjeldahl Nitrogen as N	mg/L	*		*	once/month	grab
Nitrate plus Nitrite as N	mg/L	*		*	once/month	grab
Down-Stream Monitoring Point						
Biochemical Oxygen Demand$_5$	mg/L	*		*	once/month	grab
Total Phosphorus as P	mg/L	*		*	once/month	grab
Total Kjeldahl Nitrogen as N (TKN)	mg/L	*		*	once/month	grab
Nitrate plus Nitrite as N	mg/L	*		*	once/month	grab
Surface Water Compliance						
$\frac{\text{Down-stream Monitoring Point Average BOD}_5}{\text{Up-stream Monitoring Point Average BOD}_5}$ x 100	%			105	once/month	calculated
$\frac{\text{Down-stream Monitoring Point Average P}}{\text{Up-stream Monitoring Point Average P}}$ x 100	%			105	once/month	calculated
$\frac{\text{Down-stream Monitoring Point Average Total N}}{\text{Up-stream Monitoring Point Average Total N}}$ x 100	%			105	once/month	calculated

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE MAY 28, 2005. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Parts I, II & III STANDARD CONDITIONS DATED October 1, 1980 and August 15, 1994, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Influent						
Flow	MGD	**		**	once/month	24 hr. average
Biochemical Oxygen Demand$_5$	mg/L	**		**	once/month	***
Total Suspended Solids	mg/L	**		**	once/month	***
pH - Units	SU	**		**	once/month	grab
Total Phosphorus as P	mg/L	**		**	once/month	grab
Total Kjeldahl Nitrogen as N	mg/L	**		**	once/month	grab
Nitrate plus Nitrite as N	mg/L	**		**	once/month	grab
Fecal Coliform	#/100mL	**		**	once/month	grab
Effluent (prior to land application)						
Flow	MGD	**		**	once/month	24 hr. average
Biochemical Oxygen Demand$_5$	mg/L	**		**	once/month	***
Total Suspended Solids	mg/L	**		**	once/month	***
pH - Units	SU	**		**	once/month	grab
Total Phosphorus as P	mg/L	**		**	once/month	grab
Total Kjeldahl Nitrogen as N	mg/L	**		**	once/month	grab
Nitrate plus Nitrite as N	mg/L	**		**	once/month	grab
Fecal Coliform	#/100mL	**		**	once/month	grab

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE MAY 28, 2005. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Parts I, II & III STANDARD CONDITIONS DATED October 1, 1980 and August 15, 1994, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

* See Special Condition #7.

** Monitoring requirement only.

*** A composite sample made up from a minimum of four grab samples collected within a 24-hour period with a minimum of two hours between each grab sample.

C. SPECIAL CONDITIONS

1. This permit may be reopened and modified, or alternatively revoked and reissued, to:

   (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

      (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

      (2) controls any pollutant not limited in the permit.

   (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.

   (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.

   The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

2. All monitoring points must be clearly marked in the field.

3. Permittee will cease discharge by connection to areawide wastewater treatment system within 90 days of notice of its availability.

4. Changes in Discharges of Toxic Substances

   The permittee shall notify the Director as soon as it knows or has reason to believe:

   (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"

      (1) One hundred micrograms per liter (100 µg/L);

      (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

      (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;

      (4) The level established in Part A of the permit by the Director.

   (b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.

5. Water Quality Standards

   (a) Discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.

   (b) General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:

      (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;

      (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;

C. SPECIAL CONDITIONS (continued)

(3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;

(4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;

(5) There shall be no significant human health hazard from incidental contact with the water;

(6) There shall be no acute toxicity to livestock or wildlife watering;

(7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;

6. Sludge and Biosolids Use For Domestic Wastewater Treatment Facilities

(a) Permittee shall comply with the pollutant limitations, monitoring, reporting, and other requirements in accordance with the attached permit Standard Conditions.

(b) If sludge is not removed by a contract hauler, permittee is authorized to land apply biosolids. Permit Standard Conditions, Part III shall apply to the land application of biosolids. Permittee shall notify the department at least 180 days prior to the planned removal of biosolids. The department may require submittal of a biosolids management plan for department review and approval as determined appropriate on a case-by-case basis.

7. Compliance for surface water is based on no reduction in water quality in Bull Creek downstream of the irrigation field compared to water quality in Bull Creek upstream of the irrigation field. Compliance for groundwater is based on no reduction in water quality in the monitoring wells down-gradient of the irrigation field compared to water quality in the monitoring wells up-gradient of the irrigation field. Water quality shall be based on three compliance parameters: Total Nitrogen as N (mg/L), which is the sum of Total Kjeldahl Nitrogen as N (mg/L) and Nitrate plus Nitrite as N (mg/L); Total Phosphorus as P (mg/L); and Five-Day Biochemical Oxygen Demand (mg/L).

For surface water the system shall be deemed in compliance if each of the three compliance parameters in the downstream Bull Creek samples are no greater than one-hundred-five percent (105%) of each of the same parameter in the upstream Bull Creek samples. For surface water, the system shall be deemed in significant noncompliance if any of the three compliance parameters in the downstream Bull Creek samples are greater than one-hundred-forty-seven percent (147%) of the same parameter in the upstream Bull Creek samples.

For groundwater, the system shall be deemed in compliance if the arithmetic averages of each of the three compliance parameters in samples taken from the down-gradient monitoring wells are no greater than one-hundred-five percent (105%) of the arithmetic averages of the same parameters in samples taken from the up-gradient monitoring wells. For groundwater, the system shall be deemed in significant noncompliance if any of the arithmetic averages of the three compliance parameters in samples taken from the down-gradient monitoring wells are greater than one-hundred-forty-seven percent (147%) of the arithmetic average of the same parameter in samples taken from the up-gradient monitoring wells.

Upstream and downstream samples from Bull Creek shall be taken within a four- (4) hour period. Up-gradient and down-gradient samples of groundwater shall be taken at approximately the same time.

8. Prior to wastewater treatment facility or irrigation field operation, the permittee shall develop an irrigation field management plan that will result in compliance for both surface water and groundwater as defined in Special Condition #7 above. This plan shall be submitted to the department for approval **August 1, 2005**. Once approved the plan shall be implemented. This plan shall contain, as a minimum, the following elements:

(a) Location and monitoring frequency of lysimeters to monitor soil water for phosphorus and nitrogen. This will aid in determining nutrient movement through the soil, serve as an early warning system for potential phosphorus or nitrogen break through into surface water or groundwater, and will aid in resizing the irrigation field for this and subsequent phases.

(b) Location and monitoring frequency of piezometers. This will aid in determining the groundwater level, serve as an early warning system for potential groundwater mounding problems, and will aid in resizing the irrigation field for this and subsequent phases.

C. SPECIAL CONDITIONS (continued)

(c) Annual soil testing of phosphorus adsorption maximum (b value), phosphorus adsorption rate constant (K), pH, cation exchange capacity, organic matter, major nutrients (and minor nutrients as needed) in the soil down to the bottom of the root zone for the different soil types in both the warm season and cool season grass plots. This information will aid in determining application rate of potassium (and minor nutrients as needed) soil amendments as well as pH adjustment soil amendments (powdered limestone, powdered dolomite, or both). The phosphorus and nitrogen results will aid in resizing the irrigation field for this and subsequent phases. Major nutrients are nitrogen, phosphorus, and potassium. Minor nutrients are magnesium, calcium, sulfur, iron, manganese, boron, chloride, zinc, copper, and molybdenum.

(d) Application rates and schedules for soil amendments based on soil tests for both the warm season and cool season grass plots.

(e) Initial and annual soil testing of phosphorus and nitrogen in the soil layer below the bottom of the root zone down to the water saturation level for the different soil types in both the warm season and cool season grass plots. This will aid in determining nitrogen and phosphorus movement through the soil, serve as an early warning system for nitrogen and phosphorus break through into surface water or groundwater, and will aid in resizing the irrigation field for this and subsequent phases.

(f) Seasonal irrigation schedules for both the warm season and cool season grass plots, including allowances for field drying prior to harvest and allowances for hay harvesting, including mowing / conditioning, hay drying, raking, baling, and bale removal.

(g) Periodic (minimum once each business day) measurement of precipitation.

(h) Measurement of weight of both warm season and cool season hay removed annually with analysis (or estimate if more appropriate) of nitrogen, phosphorus, and potassium (as well as minor nutrients if appropriate) removed from the irrigation plots in the hay.

(i) Annual report submitted to the department that analyzes trends in nitrogen and phosphorus movement though the soil, soil water, groundwater, and surface water and includes a material balance for water, phosphorus, and nitrogen considering wastewater irrigated, precipitation, soil water and nutrients stored in the root zone, soil water and nutrients stored below the root zone, groundwater movement, surface water movement, evaporation, transpiration, and hay harvested.

9. A reserve irrigation field of 18.5 acres shall be set aside temporarily in case the initial 18.5 acre irrigation field proves to be inadequate to achieve compliance as outlined in Special Condition #7.

10. Prior to wastewater treatment facility or irrigation field operation, the permittee shall develop a protocol prepared by a professional engineer registered in the State of Missouri to reassess irrigation field sizing for this and subsequent phases and this protocol shall be submitted to the department for approval by **August 1, 2005**. The approved protocol shall be used to increase the irrigation field if needed, allow additional connections to the initial irrigation field if appropriate, release part or all of the reserve irrigation field if appropriate, and size irrigation fields for future phases.